



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

8C

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/771,300	01/25/2001	Jar J. Lee	PD-99W059	9203

7590 12/19/2001

Leonard A. Alkov, Esq.
Raytheon Company
P.O Box 902 (E1/E150)
El Segundo, CA 90245-0902

EXAMINER

CHEN, SHIH CHAO

ART UNIT	PAPER NUMBER
----------	--------------

2821

DATE MAILED: 12/19/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/771,300

Applicant(s)

LEE ET AL.

Examiner

Shih-Chao Chen

Art Unit

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 January 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Drawings

1. Figure 1-3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: on page 1, line 14, the U.S. patent No. 5,874,195 does not correct.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 6-10, 13 and 15-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

✓ In claim 6, line 1, the words "said array" is indefinite. Because "said array" can be either "an array of metal protrusions on a metal sheet" or "an array of wide band flared notch radiating elements".

- ✓ 5. Claim 6 recites the limitation "each element" in line 4. There is insufficient antecedent basis for this limitation in the claim.

- ✓ 6. Claim 7 recites the limitation "the corporate feed network" in lines 6-7. There is insufficient antecedent basis for this limitation in the claim.
- ✓ 7. Claim 9 recites the limitation "the radiating element" in line 1. There is insufficient antecedent basis for this limitation in the claim.
- ✓ 8. Claim 13 recites the limitation "the corporate feed network" in line 6. There is insufficient antecedent basis for this limitation in the claim.
- ✓ 9. Claim 15 recites the limitation "the radiating element" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sievenpiper et al. (IEEE, Vol. 47, No. 11, November 1999, pages 2059-2074) in view of Lee et al. (U.S. Patent No. 5,894,288).

Regarding claims 1 and 11, Sievenpiper et al. teaches in figures 1(a)-1(b) and 6 a high impedance ground surface structure, comprising an array of metal protrusions on a metal sheet, the metal protrusions arranged in a two-dimensional lattice.

Regarding claims 2 and 17, Sievenpiper et al. teaches in figures 1(a)-1(b) and 6 the ground surface structure is a magnetic conductor surface at an RF frequency band

of interest, the ground plane structure functioning as a D.C. short and as a mirror which reflects an RF field in the frequency band with virtually no phase reversal.

Regarding claims 3 and 18, Sievenpiper et al. teaches in figures 1(a)-1(b) and 6 wherein the protrusions form a very thin layer of a densely packed two-dimensional periodic structure on top of a conducting surface, the periodic structure shielding the conducting surface underneath from inducing an image current to cancel the propagating E-field.

Regarding claims 4 and 19, Sievenpiper et al. teaches in figures 1(a)-1(b) and 6 wherein the array of metal protrusions are formed as metal plates connected to the metal sheets by vertical posts.

Regarding claim 5, Sievenpiper et al. teaches in figures 1(a)-1(b) and 6 wherein the metal plates have a hexagonal shape.

Sievenpiper et al. teaches every feature of the claimed invention except for an array of wide band flared notch radiating elements; a end-fire antenna for mounting on a nose cone of an aerial vehicle; a beam-forming network connected to the radiating elements; a plurality of radiating elements arranged end-to-end along a common end-fire axis; and the beam-forming network includes a true-time-delay network.

Lee et al. teaches in figures 1-7 an array of wide band flared notch radiating elements [100A-100H]; a end-fire antenna [50A, 50B] for mounting on a nose cone of an aerial vehicle; a beam-forming network [204] connected to the radiating elements [100A-100H]; a plurality of radiating elements [100A-100H] arranged end-to-end along a

common end-fire axis [152]; and the beam-forming network [204] includes a true-time-delay network [200].

Since one of ordinary skill in the art would have recognized the benefit of various alterations and modifications in order to provide a wideband end-fire array of radiating elements includes a plurality of planar radiating elements arranged end-to-end along a common end-fire axis, each element comprising a flared notch radiating element. The array further includes a true-time-delay corporate feed network connected to the radiating elements (See col. 1, lines 37-43), it would have been obvious to provide Sievenpiper et al. with an array of wide band flared notch radiating elements; a end-fire antenna for mounting on a nose cone of an aerial vehicle; a beam-forming network connected to the radiating elements; a plurality of radiating elements arranged end-to-end along a common end-fire axis; and the beam-forming network includes a true-time-delay network as taught by Lee et al.

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shih-Chao Chen whose telephone number is (703) 306-2721. The examiner can normally be reached on Monday-Friday from 7 AM to 4:30 PM, First Fri. off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on (703) 308-4856. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-5841 for After Final communications.

Application/Control Number: 09/771,300

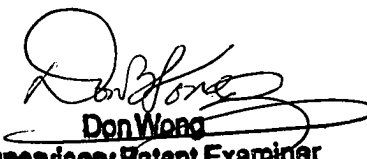
Page 6

Art Unit: 2821

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Shih-Chao Chen
Examiner
Art Unit 2821

SXC
December 6, 2001


Don Wong
Supervisory Patent Examiner
Technology Center 2800